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A Water Protection Strategy for MONTANA

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Missouri River Basin

SUMMARY REPORT

MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION
Water Resources Division
September, 1982

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SUMMARY REPORT ON

A WATER PROTECTION STRATEGY

FOR MONTANA

— MISSOURI RIVER BASIN —

PREPARED BY

WATER RESOURCES DIVISION
MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

AND

WRIGHT WATER ENGINEERS, INC.

SEPTEMBER 1982

82-304

FOREWORD

This summary report presents the findings of a study undertaken by the Department of Natural Resources and Conservation in response to a directive by the 47th Session of the Montana legislature (House Bill 709). That legislation appropriated funds to the Department for a study to "...develop a strategy to protect Montana's water from downstream uses and insure water availability for Montana's future needs..." The study is to provide the Montana legislative and executive branches with background information, a problem analysis, and recommendations on Montana's major water question: How to protect Montana's water for current and future instate use from downstream commitments? The document serves as a basis for water policy, planning, and implementation decisions.

A strategy committee of the Department of Natural Resources and Conservation provided the direction, scope, critique, contribution of strategies, and final editing for this study. The individuals involved include:

Richard Moy	Chief, Water Management Bureau
Gerhard Knudsen	Supervisor, Water Planning Section
Jack Acord	Asst. Administrator, Water Resources Division
Richard Brasch	Program Manager, Water Engineering Bureau
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Gary Fritz, Administrator, Water Resources Division, provided valuable direction to this committee, assisting it in performing the assigned duties and carrying out the objectives of the study.

Other DNRC staff who provided technical assistance and participated in the critical review include:

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This study was prepared for DNRC by Frank J. Trelease III, Leo M. Eisel, and Marilyn M. Stokes of Wright Water Engineers, Inc. (Cheyenne, Wyoming, and Denver, Colorado) and Frank J. Trelease, Esq. of McGeorge School of Law, Sacramento, California. Assisting this team in economics were James J. Jacobs and Verne W. House. Special assistance was provided by the U.S Army Corps of Engineers, Missouri River District, Reservoir Control Center, through a cooperative agreement with the State of Montana, for the use of the Corps computerized Missouri River operation model.

ACKNOWLEDGMENTS

The Department gratefully acknowledges the Montana Historical Society for its assistance in preparing copies of the drawings used in the report. The sketches highlight several features of the Missouri River observed during expeditions to Montana in the mid-1800's. The cover sketch by Gustave Sohon is from "Explorations and Surveys for a Railroad Route from the Mississippi River to the Pacific Ocean," Vol. XII, Book 1 (Washington, Thomas H. Ford, 1860). All other drawings are from "Pencil Sketches of Montana," (New York, A.E. Mathews, 1868).

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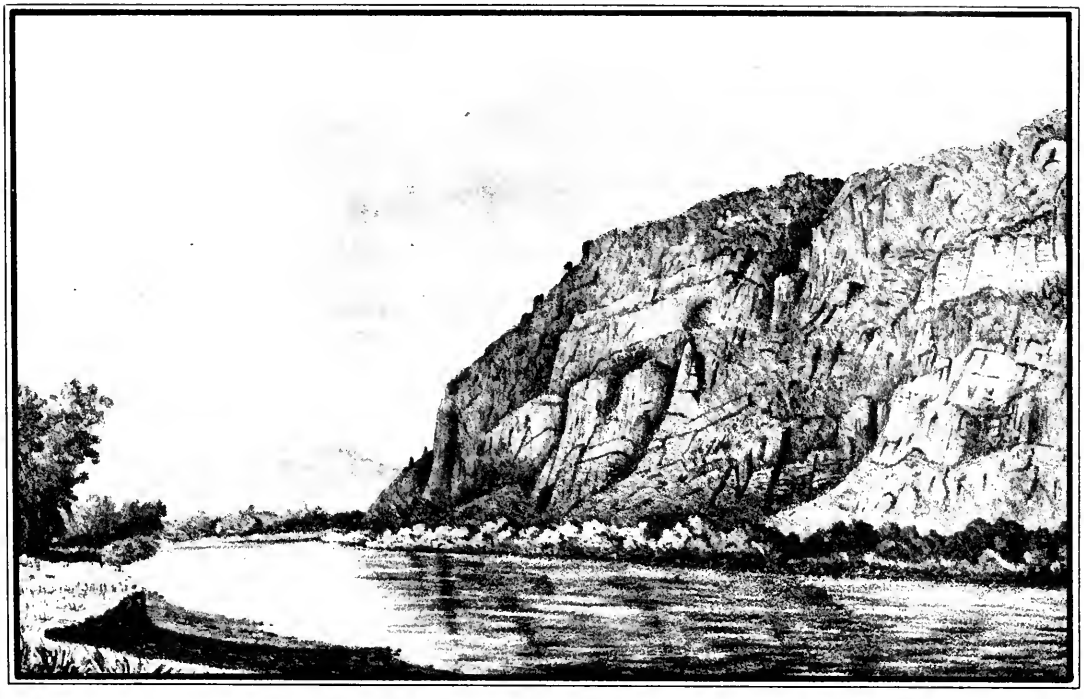


STUDY DIRECTIVE

Montana's water and related land resources provide a quality environment in which to live, work, and relax. Indeed, it is this state's concern that its water resources are managed in a manner that will maintain this quality environment and assure an adequate supply of water is available to meet our future municipal, agricultural, industrial, and other needs. With this in mind, the 1981 Montana Legislature directed the Department of Natural Resources and Conservation to develop a strategy to protect Montana's options for future instate water use in the face of expanding water development by downstream states. A feeling prevalent in Montana is that the water flowing out of the state will soon be claimed by downstream states whose use of water is growing more rapidly than Montana's. This could preclude or limit future water development in Montana. It is also feared that, given the political power of lower basin states, Montana could find it difficult to defend its claimed right to future instate use of water in a national political arena. To compensate for these possible problems, many Montanans feel that the state must develop the best strategy to protect its interests in an interstate water allocation conflict.

FOCUS OF THE STRATEGY

The State of Montana contains three major river basins; the Columbia River Basin (25,400 square miles), Missouri River Basin (121,000 square miles) and tributaries of the Hudson Bay (600 square miles) (Figure 1). The Columbia River Basin in Montana contains two important drainage basins: the Kootenai and the Clark Fork. The Missouri River Basin also contains two major drainage basins: the Yellowstone and Upper Missouri.

Streamflow records indicate that the average outflow of water from Montana is about 43,895,600 acre-feet per year. Of that amount, about 59.3 percent (26,040,000 acre-feet per year) flows into the Columbia River west of the Continental Divide. Another 2.3 percent (989,200 acre-feet per year) flows north into the Hudson Bay. The remaining 16,866,000 acre-feet per year, or 38.4 percent, flows downstream into the Missouri River system.

The potential for conflict in the major drainage basins of Montana was evaluated. The results from this evaluation revealed that the greatest potential for conflict is in the Missouri River Basin of Montana.

In the Clark Fork Basin of Montana, the amount of water available for the development of new consumptive uses is apparently limited because of prior rights for hydroelectric power. The 397 mw hydroelectric power plant at Noxon Rapids owned and operated by Washington Water and Power has a direct flow water right of 35,000 cfs with a 1960 priority and 15,000 cfs with a 1974 priority. A DNRC water availability analysis (Fitz, 1981) showed that no surplus water is available in three out of ten years on the average and that which is available only occurs between May 10 and June 25 in the other seven years. Thus, the unclaimed water available to support new large-scale consumptive uses in the Clark Fork Basin of western Montana is somewhat limited and the development of storage facilities would be needed to put it to use.

In the Kootenai River Basin, a large volume of water is apparently available for future consumptive uses. However, the demand for consumptive purposes appears to be limited because of the high annual rainfall and the lack of irrigable lands.

Even though the Columbia River Basin of Montana was de-emphasized in this study, this is not to say that the opportunity for conflict does not exist. The Columbia River system is already highly developed for instream hydropower uses. Potential conflicts exist beween Montana's consumptive use needs and the maintenance of instream flows for hydroelectric power production, both instate as well as among downstream states. However, the Department chose to concentrate this study on the problems of interstate water allocation in the Missouri River Basin since the greatest threat from downstream states arises in that basin.

DESCRIPTION OF THE MISSOURI RIVER BASIN

Montana is the headwaters of the Missouri River. Together with its major tributary, the Yellowstone River, the Missouri River flows through Montana, downstream through North Dakota, South Dakota, Nebraska, Iowa, Kansas, and Missouri. The Missouri River and its tributary streams in those states and in Wyoming, Colorado, and Minnesota are important sources of water for such consumptive development as irrigation, and municipal, and industrial use. Figure 2 shows the Missouri River Basin and its tributaries, and the division between the upper and lower basins at Sioux City, Iowa.

Montana is an important contributor of water to the Missouri River system

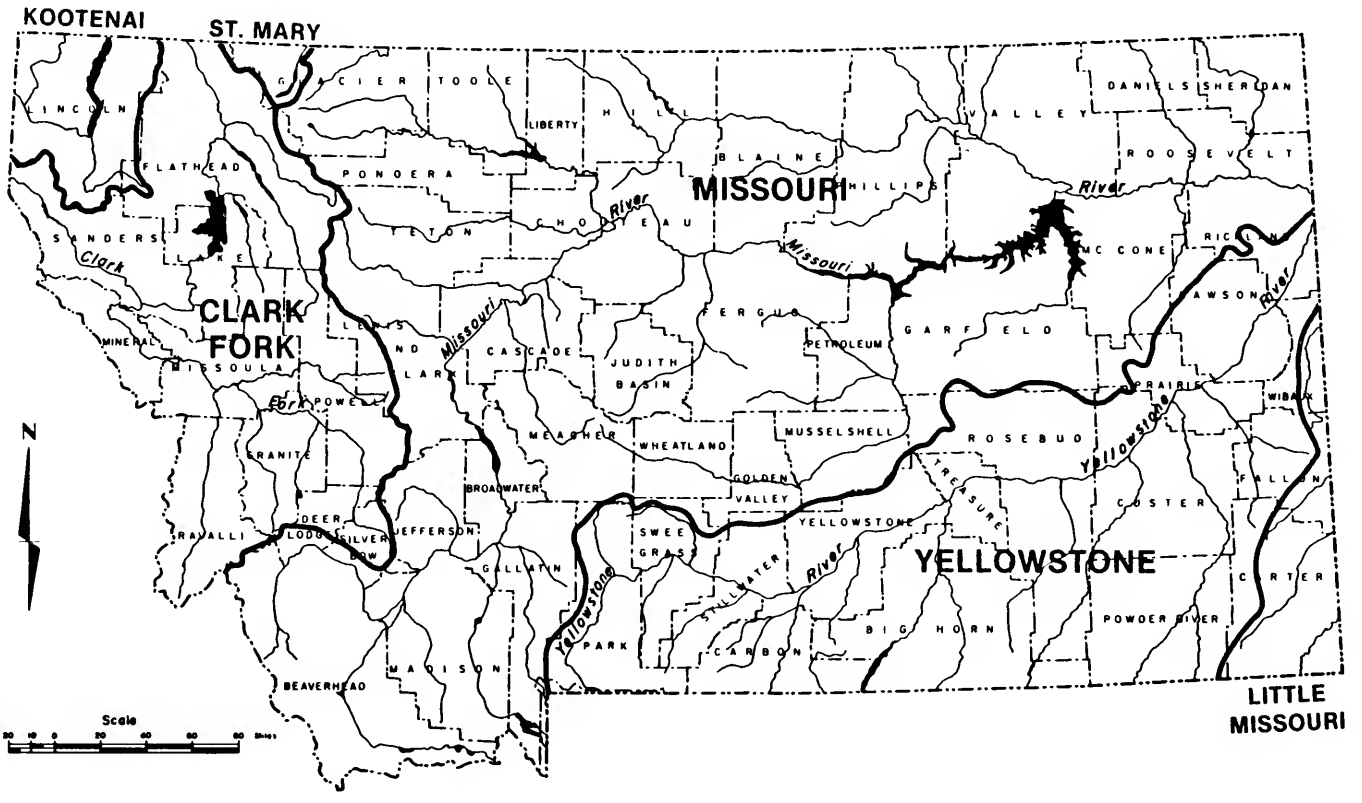


FIGURE 1 DRAINAGE BASIN BOUNDARIES , STATE OF MONTANA

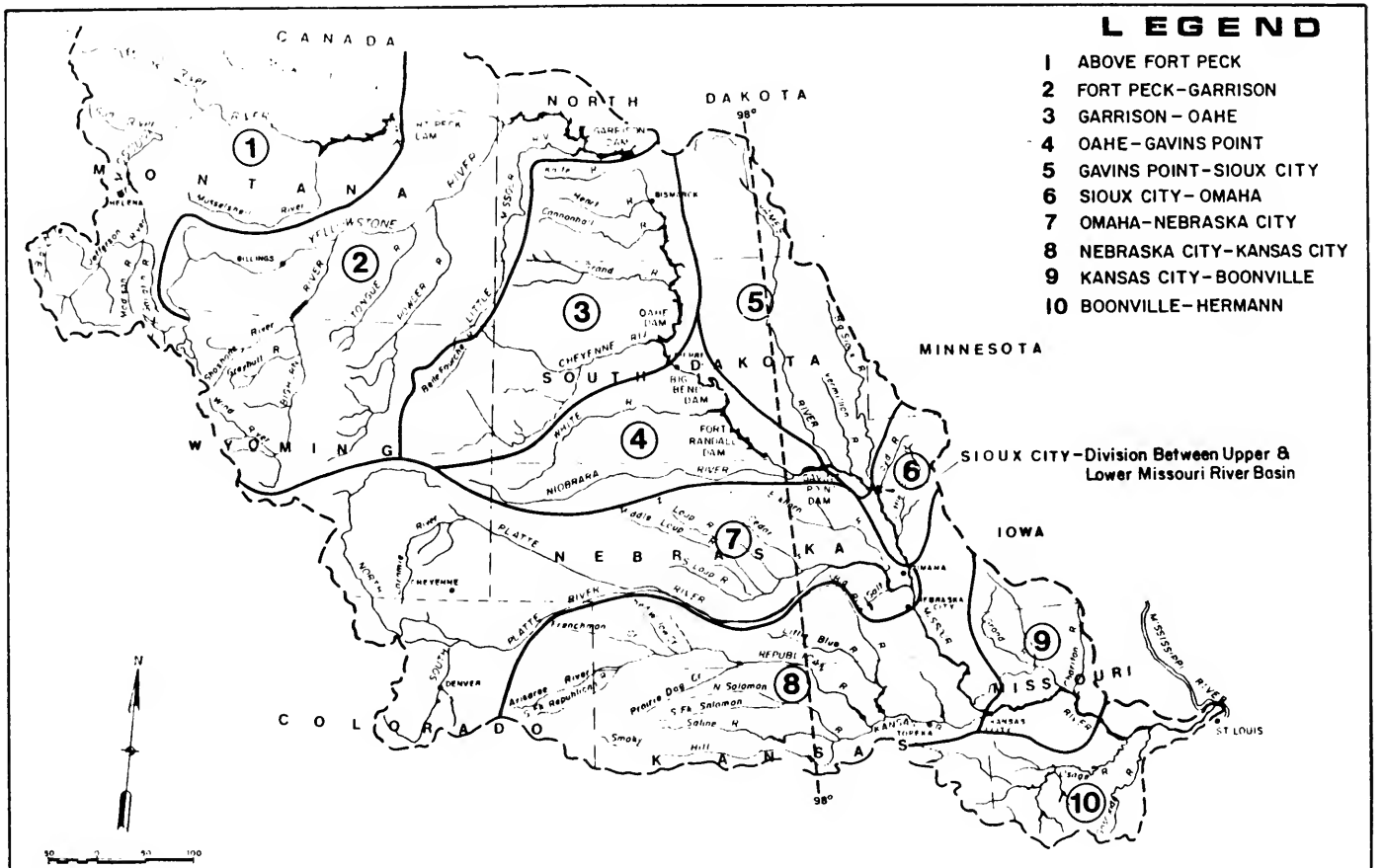


FIGURE 2 MISSOURI RIVER STUDY REACHES

(Table 1). At the 1975 level of depletion, the average annual outflow from Montana in the upper Missouri River is 7,774,000 acre-feet per year; at the Montana state line the average flow of the Yellowstone and other tributaries is about 8,804,000 acre-feet per year. Montana contributes about 50 percent of the average streamflow at Sioux City, Iowa (21,725,000 acre-feet per year), and 19 percent of the streamflow at the mouth of the Missouri River (54,559,000 acre-feet per year) near Hermann, Missouri.

TABLE 1 MONTANA WATER CONTRIBUTION AND STATE LINE STREAMFLOWS AS A PERCENTAGE OF MISSOURI RIVER STREAMFLOWS

RIVER REACH	Average Annual[1]			Low Flow Period[5]	
	Flow,[1] 1,000 A-F	Montana[2,4] Contribution %	Montana[3,4] Outflow %	Flow 1,000 A-F	Montana[4] Outflow %
Fort Peck Dam	6,537	100	-	4,030	-
Garrison Inflow	16,578	62	100	11,225	100
Oahe Dam	18,255	57	91	11,944	94
Fort Randall Dam	18,905	55	88	12,056	93
Gavins Point Dam	20,273	51	82	13,160	86
Sioux City	21,725	48	76	13,849	81
Omaha	23,016	45	72	14,370	78
Nebraska	27,314	38	61	16,429	68
Kansas City	36,527	28	45	21,400	52
Boonville	42,666	24	39	26,249	43
Hermann	54,559	19	30	37,631	30

[1]1975 Level of flows, 1898-1979 period.

[2]Inflow to Montana is 6,227,000 acre-feet per year from Wyoming in the Yellowstone River basin.

[3]Garrison inflow is approximately the Montana State line flow.

[4]Percentage approximate because no adjustment made for conveyance.

[5]1934-1942 period.

Source: Corps of Engineers, US Army, Missouri River Division, Mainstem Reservoir Regulation Studies.

NATURE OF THE CONFLICT

The potential for conflict in the Missouri River Basin is real and involves the 1944 Flood Control Act, commonly called the Pick-Sloan Missouri Basin Program. This Act combined two plans, one by the Army Corps of Engineers (the Pick Plan) and the other by the Bureau of Reclamation (the Sloan Plan). The Corps plan focused on the construction of large main stem reservoirs on the Missouri River for flood control and the development and maintenance of downstream navigation. The Bureau plan involved the development of water for consumptive purposes, primarily irrigation.

In passing the Act, Congress authorized a system of six main stem reservoirs, including the existing Fort Peck Dam, to control floods and to provide navigation in the lower Missouri River Basin. Hydroelectric power produced at these main stem dams and other dams in the basin is an important source of energy, primarily in the lower basin.

Beside the flood control and navigational benefits, Congress recognized the importance of water development for other purposes and authorized many irrigation projects and storage reservoirs throughout the upper and lower Missouri River Basin. Congress also adopted the O'Mahoney-Milliken Amendment which specified that providing streamflows for navigation was not to interfere with upper basin development of water which arises west of the 98th Meridian. This provides consumptive uses in Colorado, Montana, Wyoming, South Dakota, North Dakota, Kansas, and Nebraska.

The lower basin states have been receiving current level benefits from the 1944 Act since the mid-1960's, when the last of the six main stem reservoirs was completed. These reservoirs have provided the lower basin states with a barge transportation industry, cheap hydroelectricity, and flood protection. In return for providing these benefits (all main stem reservoirs are in Montana, North Dakota, and South Dakota), the upper basin states were promised the development of consumptive uses under the Pick-Sloan Plan. To date, only a few of the federal water projects for consumptive purposes have been completed and many contemplated projects have not been started. Recent actions by the upper basin states to develop these projects have initiated the conflict between the upper and lower basins. The lower basin states perceive upper basin development as a threat because they do not want to lose any of their existing benefits and also want water available for their future consumptive development. Thus, they have begun to challenge upper basin development in order to prevent additional upstream consumptive uses. These and other challenges to Montana take many forms, but four are of particular concern:

(1) Energy Transportation Systems, Inc. (ETSI) has purchased 50,000 acre-feet per year of Lake Oahe water from South Dakota and the Bureau of Reclamation. ETSI plans to transport Missouri River water 280 miles to the coal fields near Gillette, Wyoming. From there, water would be used to slurry Wyoming coal 1600 miles to power plants in Arkansas and adjacent states. Although this quantity of water is only about two-tenths of one percent of the average annual flow (21,725,000 acre-feet) at Sioux City, Iowa (equivalent to one-eighth to one-tenth of the total water that evaporates each year from Oahe Reservoir), the states of Missouri, Iowa, and Nebraska are concerned that this sale and interbasin transfer of Missouri River water will set a precedent.

Several pieces of legislation have been introduced by the lower basin states to control upstream water use. The State of Missouri passed legislation authorizing its Governor to enter into an interstate compact among the

lower basin states for the protection and development of barge traffic on the Missouri River. Representative Bedell of Iowa introduced H.R. 5278 in the 97th Congress to prohibit any state from selling or otherwise transferring interstate waters located in the state for use outside that state unless all other states in the drainage basin consent to the sale or transfer. If passed, this bill would have the effect of prohibiting all sales and interbasin transfers from the Missouri River Basin. Representative Young of Missouri introduced a bill, H.R. 7151, that would grant the consent of Congress to the states of the Missouri River Basin to negotiate and enter into an interstate compact for the equitable allocation of the waters of the Missouri River Basin. Disturbing features of the bill require that any compact or agreement shall not cause deterioration in the water quality of any state of the Missouri River Basin and shall not reduce the navigational capacity of the Missouri River.

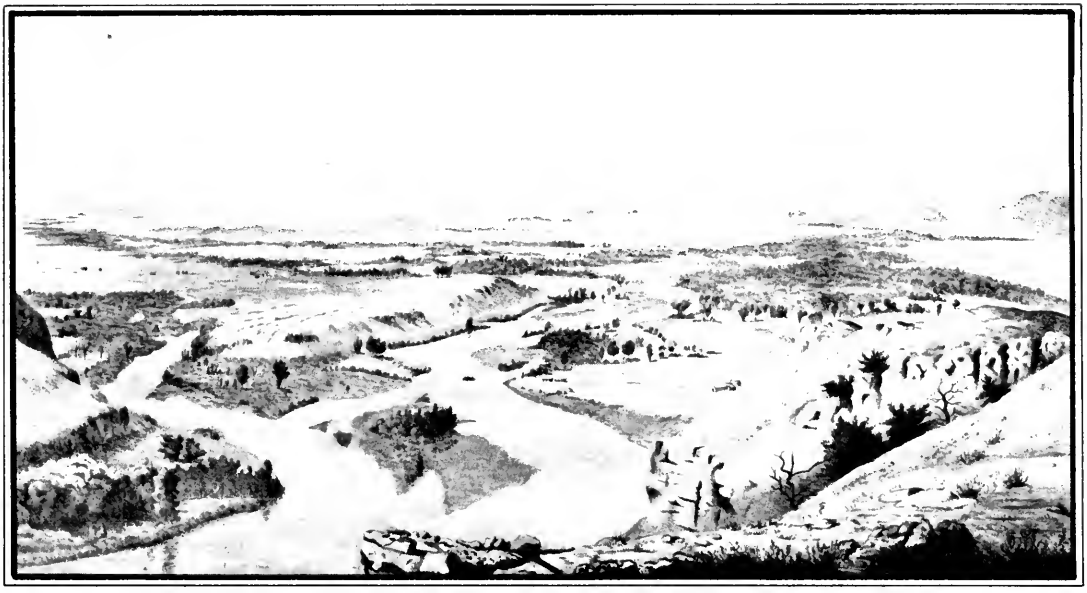
In addition, two lawsuits (the States of Missouri, Iowa and Nebraska vs. Colonel Andrews Jr. et al., and Kansas City Southern Railway Company et al. vs. Colonel Andrews Jr. et al.) were filed August 1982 in the U.S. District Court in Nebraska. These suits attempt to halt the ETSI sale and diversion, contending that the Department of Interior unlawfully approved the 50,000 acre-feet per year depletion and the Corps of Engineers unlawfully issued a permit for construction of a water intake facility to make the depletions possible. The overtones to these two lawsuits suggest that the lower basin states would like to curb future depletions in the upper basin by having the 1944 Flood Control Act reinterpreted.

(2) The High Plains study proposes alternatives that may present a threat to Montana and the other basin states. This $6 million Department of Commerce study, authorized by Congress in 1976, looked at alternatives for assuring adequate water supplies to the High Plains states where the Ogallala aquifer is being rapidly depleted. The affected states include Oklahoma, Colorado, Kansas, Nebraska, New Mexico, and Texas. By the year 2020, ground water depletions in this area are estimated to result in a loss to irrigation of more than one-third of the 14.3 million acres now supplied from the Ogallala aquifer. The High Plains Study Council, consisting of the governors of the six states, has chosen several mitigating solutions, but the only long-term solution is to import water into the High Plains region. Two of the four import alternatives would divert about four million acre-feet per year from the Missouri River at either Lake Francis Case behind Fort Randall Dam or at St. Joseph, Missouri.

(3) All of the other upper basin states are identifying water development priorities for the 1980's. For example, North Dakota's top priority is to develop 250,000 acres of irrigated land with water from the Garrison Reservoir Project. South Dakota wishes to withdraw 1.5 million acre-feet per year for irrigation in the Central South Dakota Project (CENDAK). Wyoming has authorized $114 million for water development as a first step in a possible six-year, $600 million statewide water development program.

(4) Threats to upstream Missouri River water use could also arise from studies by the Army Corps of Engineers. The Missouri River Division of the Corps is completing a study of Mississippi River navigation that includes an analysis of the effects of Missouri River flows. Navigation on the Missouri River annually produces about $20 million in benefits from the transportation of three million tons of freight. In contrast, more than 50

million tons are transported annually on the Mississippi River. Preliminary results of the study indicate that regulation of the Missouri River has a significant effect on the flows of the Mississippi River. No current authorizations relate the Missouri River regulation to benefits on the Mississippi, but the Corps of Engineers' study could lead to suggestions that Congress consider such authorization. Additionally, the Corps is contemplating the development of a railroad-barge combination which would allow barge traffic to transport 17 million tons of coal per year downstream of Sioux City, Iowa. This would increase total barge tonnage to the projected level of 20 million tons per year, and would only intensify the problem between the upper and lower basin states.



TIMING AND MAGNITUDE OF POSSIBLE WATER CONFLICT

A major part of this study attempted to define the timing and magnitude of potential water conflicts in the Missouri River Basin. The objectives of this assessment were:

(1) To provide factual information for an analysis of the economic impacts of various water allocations;

(2) To provide technical support for legal conclusions regarding the possible need for water allocation and kinds of allocation that might be considered; and

(3) To establish the magnitude and timing of conflicts so that a strategy for water allocation can be devised.

High, medium, and low projections of future water consumption and development were derived for Montana and the rest of the basin. The projected depletions include uses for irrigation, energy, municipal, industrial, interbasin diversions, and others for four planning periods, 1975-1990, 1975-2000, 1975-2020, and 1975-2040 (Tables 2 and 3), and are identified by river reach. These projections were based on a thorough literature review of available reports issued from such agencies as the Missouri River Basin Commission, the Bureau of Reclamation, the U.S. Army Corps of Engineers, the U.S. Department of Agriculture, several agencies in each of the ten states, private entities, and local government. Primarily, the projections came from the Missouri River Basin Comprehensive Framework Study (1969), Bureau of Reclamation Water Marketing Study (1974), and Missouri River Basin Commission Level B Studies. These projections were then evaluated and modified in this study to make them more realistic.

The projections were combined into eight scenarios, shown in Table 4, for testing the sensitivity of the main

TABLE 2 SUMMARY OF LOW, MEDIUM, AND HIGH PROJECTIONS OF MISSOURI RIVER BASIN DEPLETIONS FOR ALL WATER USES EXCEPT MAJOR INTERBASIN DIVERSIONS

1,000 Acre-Feet Per Year

River Reach	1975-1990			1975-2000			1975-2020			1975-2040		
	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
Above Fort Peck	62	133	320	183	375	496	375	496	731	550	835	1158
Fort Peck to Garrison	454	716	1023	895	1489	2175	1538	2251	2884	2251	2884	4518
Garrison to Oahe	80	154	269	289	415	718	598	1063	1309	860	1440	1904
Oahe to Gavins Point	7	7	7	60	60	60	206	206	206	259	259	259
Gavins Point to Sioux City	100	100	84	80	72	60	220	204	150	204	204	204
Sioux City to Omaha	236	288	384	329	464	564	520	665	1044	767	1059	1182
Omaha to Nebraska City	804	915	1092	915	1092	1596	1092	1596	1905	1596	1905	1942
Nebraska City to Kansas City	590	805	996	996	1208	1488	1245	1503	2508	1505	2545	2907
Kansas City to Boonville	236	337	432	344	430	588	432	596	864	602	868	936
Boonville to Hermann	170	250	336	276	352	456	365	450	720	500	703	865
Total above Sioux City	703	1110	1703	1507	2411	3509	2937	4220	5280	4124	5622	8043
Total below Sioux City	2036	2595	3240	2830	3546	4692	3654	4810	7041	4970	7080	7832
TOTAL	2739	3705	4943	4337	5957	8201	6591	9030	12321	9094	12702	15875

TABLE 3 SUMMARY OF RECENTLY PROPOSED MAJOR INTERBASIN DIVERSIONS

1,000 Acre-Feet Per Year

River Reach	1975-1990 Low	1975-1990 Med	1975-1990 High	1975-2000 Low	1975-2000 Med	1975-2000 High	1975-2020 Low	1975-2020 Med	1975-2020 High	1975-2040 Low	1975-2040 Med	1975-2040 High
Above Fort Peck												
Fort Peck to Garrison												
Garrison to Oahe								1100	1100		1100	1100
Oahe to Gavins Point					2410	2410		4000	4000		4000	4000
Gavins Point to Sioux City												
Sioux City to Omaha												
Omaha to Nebraska City												
Nebraska City to Kansas City												
Kansas City to Boonville												
Boonville to Hermann												
Total above Sioux City	-	-	-	-	2410	2410	-	5100	5100	-	5100	5100
Total below Sioux City	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL												

TABLE 4 SUMMARY OF WATER USE SCENARIOS

Scenario Number	Title	Growth in Average Annual Depletions		
		Upstream[1]	Downstream[2]	Other
1A	Effects of Upstream Depletions	Low	Medium	--
1B	Effects of Upstream Depletions	Medium	Medium	--
1C	Effects of Upstream Depletions	High	Medium	--
2A	High Upstream, Low Downstream	High	Low	--
2B	Low Upstream, High Downstream	Low	High	--
3A	High Energy Development	High	High	--
3B	Low Energy Development	Low	Low	--
4	Interbasin Diversions	Medium	Medium	Interbasin Diversions

[1]Upstream refers to that portion of the Missouri River Basin above Garrison Dam, and includes Montana depletions and depletions in other states above Garrison. This conforms to Reaches 1 and 2 in Figure 2.

[2]Downstream refers to the rest of the Missouri River Basin below Garrison Dam.

NOTE: The division of "upstream" versus "downstream" at Garrison Dam (rather than the division at Sioux City) was done to identify the sensitivity of Montana's depletions to other uses. Because Montana's depletions were not isolated, this study used the depletions in Study Reaches 1 and 2 (Figure 2) to perform this sensitivity analysis. The terms "upstream" and "downstream" are not to be confused with the terms "upper basin" and "lower basin," which are used to indicate above Sioux City and below Sioux City, Iowa, respectively.

stem reservoir system to depletions upstream of Sioux City, Iowa, and for identifying possible impacts of future water development on navigation and hydropower benefits. These depletion scenarios were run through the computer operations program for the six main stem reservoirs by the Army Corps of Engineers, Missouri River Division, Reservoir Control Center. The operation studies took into account the depletions of water under each of the water use scenarios and simulated operations of the reservoir system in accordance with the criteria established under the 1944 Flood Control Act and subsequent authorizations and cost allocations.

The results of the analyses summarized in Tables 5 and 6 are based on the assumptions in the Corps of Engineers main stem reservoir accounting model, the assumed depletion scenarios, and the calculated flows at the 1975 level of development. These were the best data available at the time of the study. It should be noted, however, that it is very unlikely that the high depletion levels used here will be developed within the study period (1975-2040).

Continued water development in the Missouri River Basin will reduce stream flows in the main stem, result in a progressive reduction in hydropower production from the six main stem reservoirs, and eventually adversely affect navigation. However, no water shortages are projected from the main stem Missouri River by the year 2000. On the other hand, water shortages already exist on some of the tributaries of the Missouri River such as the Platte and Kansas rivers, but they should not affect the main stem of the Missouri River as a whole.

Simply stated, the nature of the potential future conflicts in the main stem of the Missouri consists of competition between water for maintenance of instream flows to accomodate navigation and hydroelectric production versus depletions of water for consumptive purposes. Depletions of water on tributaries of the Missouri River downstream of Sioux City, Iowa were found to have little or no effect on navigation when upper basin depletions were held at the "threshold" level which amounts to 1.6 to 1.7 million acre-feet per year over the 1975 level of development. The threshold level of development may be thought of as a maximum "firm supply" that could be developed without affecting navigation during a severe drought. In an average year, there may be as much as 5.3 million acre-feet available for future development and depletion.

Depletion of water from the main stem and tributaries above Sioux City, Iowa would have an effect on navigation since the six main stem reservoirs above Sioux City provide the necessary regulation of flows to maintain navigation in the lower basin.

Navigation will not be affected unless both of the following conditions occur: (1) the threshold level of depletions is surpassed, and (2) a severe prolonged drought such as the nine-year drought between 1934-1942 recurs. If water is developed at the low projection above Garrison and the medium projection between Garrison and Sioux City, and a prolonged drought does occur, navigation would be affected after the year 2000, but before the year 2020. There could be three years without navigation service. If upper basin depletions above Sioux City, Iowa occur at the medium rate of development, navigation could be suspended for up to three years before the year 2000 and five years before the year 2020 during a severe prolonged drought. If water development occurs at the high level above Garrison and a medium level between Garrison and Sioux City (that level which is protected and defined under the 1944 Flood Control Act) a severe prolonged drought could suspend navigation for three years before the year 2000 and eight years before the year 2020.

TABLE 5 SUMMARY OF ANALYSIS OF WATER DEVELOPMENT SCENARIOS

YEAR 2000

Scenario	Increased Upper Basin Depletion (1000 A-F/YR)	Increased Lower Basin Depletion (1000 A-F/YR)	2000 Level Flows Sioux City (1000 A-F/YR)	2000 Level Flows Hermann (A-F/YR)	Navigation Service Average[2] Years[4] (Months per Year)	Navigation Service Drought[3] Period (Years of No Service)	Hydropower Generation Average[2] Years (Million KW Hours)	Hydropower Generation Drought[3] Period (Million KW Hours)
1975 Level	0	0	21,725[1]	54,559[1]	7.7	0	10,408	5,408
1A*	1,625	3,546	20,221	49,505	7.5	0	9,698	4,587
1B	2,411	3,546	19,501	48,785	7.4	3	9,285	4,142
1C*	3,218	3,546	18,662	47,945	7.2	3	8,872	3,825
2A*	3,100	2,830	18,762	48,765	7.2	2	8,924	3,905
2B*	1,916	4,692	19,988	48,132	7.4	1	9,606	4,387
3A	3,509	4,692	18,404	46,547	7.1	4	8,743	3,620
3B	1,507	2,830	20,370	50,374	7.5	0[5]	9,755	4,647
4	4,821	3,546	17,198	46,482	6.6	5	8,918	3,787

Source: Wright Water Engineers and U.S. Army Corps of Engineers, Missouri River Division, Reservoir Control Center.

[1]1975 depletion level flows, rest of column is Year 2000 depletion level flows derived from computer operation studies.

[2]1898-1933, 1943-1979.

[3]1934-1942 drought period. This drought has a 2 to 3 percent chance of occurence.

[4]Full service is 8 months per year, 35,000 cfs at Sioux City, Iowa; reduced service is less than 35,000 cfs, down to 29,000 cfs minimum service. For this study, reduced service was converted by WWE to full service, shorter seasons for comparison purposes.

[5]Computer study showed 1 year of no service, but with operational adjustment, service could have been provided as in Scenario 1A.

TABLE 6 SUMMARY OF ANALYSIS OF WATER DEVELOPMENT SCENARIOS

YEAR 2020

Scenario	Increased Upper Basin Depletion (1000 A-F/YR)	Increased Lower Basin Depletion (1000 A-F/YR)	2020 Level Flows Sioux City (1000 A-F/YR)	2020 Level Flows Hermann (A-F/YR)	Navigation Service Average[2] Years[4] (Months per Year)	Navigation Service Drought[3] Period (Years of No Service)	Hydropower Generation Average[2] Years (Million KW Hours)	Hydropower Generation Drought[3] Period (Million KW Hours)
1975 Level	0	0	21,725[1]	54,559[1]	7.7	0	10,408	5,408
1A*	3,386	4,810	18,571	46,594	7.1	3	9,154	3,995
1B	4,220	4,810	17,751	45,774	6.9	5	8,696	3,608
1C*	5,088	4,810	16,876	44,902	6.8	8	8,260	3,050
2A*	4,639	3,654	17,326	46,513	6.9	7	8,440	3,259
2B*	3,578	7,042	18,389	44,180	6.8	4	9,000	3,917
3A	5,280	7,042	16,798	42,590	6.5	8	8,100	2,966
3B	2,937	3,654	18,863	48,150	7.2	2	9,316	4,242
4	9,320	4,810	12,511	40,535	4.1	365	7,686	3,488

Source: Wright Water Engineers and U.S. Army Corps of Engineers, Missouri River Division, Reservoir Control Center.

[1]1975 depletion level flows, rest of column is Year 2020 depletion level flows derived from computer operation studies.

[2]1898-1933, 1943-1979.

[3]1934-1942 drought period. This drought has a 2 to 3 percent chance of occurence.

[4]Full service is 8 months per year, 35,000 cfs at Sioux City, Iowa; reduced service is less than 35,000 cfs, down to 29,000 cfs minimum service. For this study, reduced service was converted by WWE to full service, shorter seasons for comparison purposes.

[5]In a period similar to 1898 to 1979, Navigation would be shut down 15 consecutive years (1930-1944), plus 21 other years.

Construction of major water diversions to other river basins would significantly reduce navigation service during a prolonged drought by the turn of the century (for example, a diversion to the Colorado River Basin as envisioned by the Exxon Corporation [1.1 million acre-feet per year], or a diversion to the High Plains region as envisioned by the federally proposed High Plains Project [4 million acre-feet per year]). Navigation could be shut down completely by the year 2020 if these interbasin diversions occur and the upper basin states develop at any of the projected levels.

In absolute terms, low flow maintenance and navigation service require about 16.4 million acre-feet of water per year at Sioux City, Iowa to maintain a channel depth of 9 feet over an eight-month season. At the threshold level of depletion, the flow at Sioux City, Iowa, would be reduced to an average of 20.2 million acre-feet per year. However, during a severe drought similar to the 1934-1942 period, this depletion would lower the drought flows to an average of 11.7 million acre-feet per year. Based on available river flow data, the estimated probability of such a severe drought recurring is only 2 to 3 percent. These figures illustrate that navigation can occur long after the threshold level of depletion has been reached unless there is a severe drought. During a severe drought, there would not be enough water in the system in at least one year to sustain navigation service. If water depletion doubles the threshold level (3.5 million acre-feet per year), the number of consecutive years of no navigation may increase to as many as four.

ECONOMICS OF WATER ALLOCATIONS

An economic impact analysis was conducted to ascertain the possible effects of interstate water allocations to Montana and to the other states in the Missouri River Basin. Economic parameters investigated for Montana included the irrigation and energy/coal sectors. For the rest of the basin, economic sectors included irrigation, navigation, hydropower, and the potential High Plains diversion.

Impacts were identified as changes from the high level of development scenario (which was assumed to be the level of development allowable under the terms of the 1944 Flood Control Act) to the development levels that might be set for enhancement of instream navigation and hydropower production. The following water allocations were assumed:

(1) Reduced upstream depletion (above Garrison) to protect navigation.

(2) Reduced upstream (above Garrison) and downstream (below Garrison) depletions to protect navigation.

(3) Reduced downstream depletion (below Garrison) to protect navigation.

Other comparisons were also made to determine the economic impacts of the High Plains diversion. Economic impacts were projected for the years 2000 and 2020.

Because of the limited study budget, the scope of the economic impact analysis was limited to measures of direct, or first level, economic return for selected water-using sectors. Therefore, the following values should not be treated as absolute measurements of the economic return to the various sectors, but rather as qualitative estimates to be used for policy determinations on allocation criteria. The different values for each water-using sector described below depend upon the projected level of development as shown in Tables 7 and 8.

The economic analyses for navigation assume, as do studies by the Corps of Engineers, that a major drought does not occur. Under these conditions,

TABLE 7 ECONOMIC IMPACT OF VARIOUS WATER ALLOCATIONS IMPLIED BY WATER DEVELOPMENT SCENARIOS

Scenario	Year 2000 Economic Impacts, Million $ Per Year			
	Montana		Rest of Basin	
	Function (A)Irrigation (B)Energy/Coal	Change Resulting From Implied Water Allocation	Function (1)Irrigation (2)Navigation (3)Hydropower (4)High Plains Diversion	Change Resulting From Implied Water Allocation
3A	(A) 100.6	0	(1) 1,525.1	0
	(B) 746.0	0	(2) 24.1[1]	0
			(3) 209.8	0
2B	(A) 31.9	- 68.7	(1) 1,454.5	- 70.6
	(B) 269.9	- 476.1	(2) 24.1	0
			(3) 230.5	+ 20.7
3B	(A) 31.9	- 68.7	(1) 850.6	- 674.5
	(B) 269.9	- 476.1	(2) 24.1	0
			(3) 234.1	+ 24.3
2A	(A) 100.6	0	(1) 916.2	- 608.9
	(B) 746.0	0	(2) 24.1[1]	0
			(3) 214.2	+ 4.4
1B	(A) 65.4	- 35.2	(1) 1,087.7	- 437.4
	(B) 512.7	- 233.3	(2) 24.1[1]	0
			(3) 222.8	+ 13.0
			(4) 0	0
4	(A) 65.4	- 35.2	(1) 1,087.7	- 437.4
	(B) 512.7	- 233.3	(2) 24.1[1]	0
			(3) 222.8	+ 13.0
			(4) 764.0	+ 764.0
4 Compared With 1B	(A)	0	(1)	0
	(B)	0	(2)	0
			(3)	0
			(4)	+ 764.0

[1]The navigation economic benefits shown are for average conditions of river flows. If a drought such as 1934-1942 occurs, no navigation service could be provided in 2 to 4 consecutive years.

TABLE 8 ECONOMIC IMPACT OF VARIOUS WATER ALLOCATIONS IMPLIED BY WATER DEVELOPMENT SCENARIOS

Scenario	Year 2020 Economic Impacts, Million $ Per Year			
	Montana		Rest of Basin	
	Function (A)Irrigation (B)Energy/Coal	Change Resulting From Implied Water Allocation	Function (1)Irrigation (2)Navigation (3)Hydropower (4)High Plains Diversion	Change Resulting From Implied Water Allocation
3A	(A) 121.9	0	(1) 2,177.5	0
	(B)1,201.8	0	(2) 19.8[1]	0
			(3) 194.4	0
2B	(A) 57.1	- 64.8	(1) 2,118.7	- 58.8
	(B) 512.7	- 689.1	(2) 24.7[1]	+ 4.9
			(3) 216.0	+ 21.6
3B	(A) 57.1	- 64.8	(1) 1,190.8	- 986.7
	(B) 512.7	- 689.1	(2) 24.7[1]	+ 4.9
			(3) 223.6	+ 29.2
2A	(A) 121.9	0	(1) 1,244.6	- 932.9
	(B)1,201.8	0	(2) 22.2[1]	+ 2.4
			(3) 199.2	+ 4.8
1B	(A) 94.1	- 27.8	(1) 1,631.0	- 546.5
	(B) 746.0	- 455.8	(2) 24.7[1]	+ 4.9
			(3) 208.7	+ 14.3
			(4)	
4	(A) 94.1	- 27.8	(1) 1,631.0	- 546.5
	(B) 746.0	- 455.8	(2) 0	- 19.8
			(3) 184.5	- 9.9
			(4) 1,318.7	+1,318.7
4 Compared With 1B	(A)	0	(1)	0
	(B)	0	(2)	0
			(3)	23.3
			(4)	+1,318.7

[1]The navigation economic benefits shown are for average conditions of river flows. If a drought such as 1934-1942 occurs, no navigation service could be provided in 2 to 8 consecutive years.

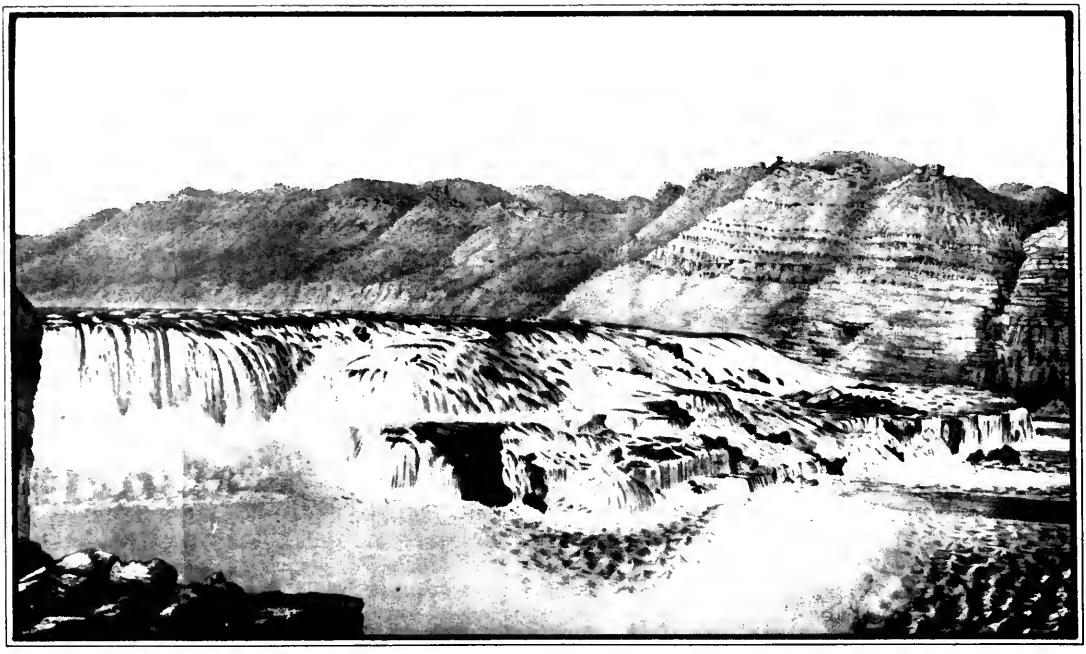
restricting water depletions in the entire Missouri River Basin has no effect on enhancing benefits of navigation service in the year 2000, and only about $2 to $5 million per year for the year 2020 (unless the High Plains diversion is developed, in which case navigation will be completely infeasible by the year 2020).

Revenues from hydroelectric power production would be increased if future water depletions are restricted in the Missouri Basin. The results showed that power revenues could increase between $13 and $24 million per year for the year 2000 and between $14 and $29 million per year for the year 2020.

Any restriction of future upstream water development to maintain navigation would be extremely detrimental to the irrigation and energy/coal sectors of Montana. If future water depletions are considerably lower than those in the high scenario, potential annual crop values of between $35 and $69 million would be lost in the year 2000. In the energy/coal sector, state and local governments would be deprived of taxes ranging between $233 and $476 million per year. The reductions in irrigated crop revenues would be approximately the same in the year 2020 as for 2000, but state and local taxes received from potential energy/coal development could be reduced substantially, between $456 and $689 million per year.

Restricting future water development for consumptive purposes would also deprive the other basin states of irrigation crop revenues amounting to $71 to $674 million per year in 2000 and between $58 to $987 million in the year 2020.

In short, the economic impacts of restricting future water development in the basin to maintain navigation are far greater than the values of both navigation and hydropower gained from limiting future consumption.



FORMS OF WATER APPORTIONMENTS USED TO RESOLVE CONFLICT

Interstate water allocation has been accomplished in the United States in three ways: equitable apportionment (water apportioned by the U.S. Supreme Court to settle disputes brought by a lawsuit among states); Congressional apportionment (action taken by Congress to settle water disputes among states); and interstate compacts (negotiated agreements among the states to administer water shortages, to divide water surpluses, or to provide planning and regulatory functions).

A detailed legal review on each of the three allocation methods is presented in Chapter V of the full report and will not be repeated here. What is important, however, is to be able to predict the possibility that one of these three means of apportionment will be used and also to be able to identify the ramifications of each as they relate to the Missouri River Basin situation. Figure 3 diagrams these possibilities.

Congressional Apportionment

Although there appears to be a question among the lower basin states as to whether or not the 1944 Flood Control Act allocates water among the Missouri River Basin states, it currently provides the assurance, through the O'Mahoney-Milliken Amendment, that future consumptive uses in the upper basin have preference over instream flows for navigation in the lower basin.

It is possible that Congress, however, through the 1944 Flood Control Act, has addressed the issue of apportionment of water between the states and has therefore provided its own method for allocating water among them. For example, specific language in Senate Document No. 191, accompanying the 1944 Flood Control Act, provides as follows:

> Summing up, provisions are made for the irrigation of 4,760,400 acres of land not now irrigated, and a

FIGURE 3

SCENARIOS OF MISSOURI RIVER BASIN ALLOCATION PROCEDURES

ACTION	RESULT	EFFECT
I. EQUITABLE APPORTIONMENT (INTERSTATE LAWSUIT)		
• Lower basin vs. Upper basin Suit to enjoin threatened harm from single project on combined depletions. Principal defense, O'Mahoney-Milliken Amendment.	Lower basin "wins." Harmful depletions enjoined.	Allowable depletion divided among upper basin states by: o Lawsuit o Compact o Congress
	Upper basin "wins." All depletions permitted.	No allocation needed. Sufficient water for all states consumptive uses.
• Upper basin vs. Lower basin Depleting projects blocked by uncertainties caused by downstream claims; suit to declare rights.	Upper basin "wins."	Projects proceed.
	Lower basin "wins."	Possible need for allocation among upper basin states, as above.
• Upper basin states vs. Each other. Upper basin depletions restricted to low levels (by any process); suit to divide permissible depletions.	Share of available water allocated to each state.	State Agencies restrict permits to state's quota.
	Refusal to divide unappropriated water.	Compact or Congressional allocation.
• U.S. refuses to become a party to any or all of above suits.	Suit dismissed.	Compact or Congressional allocation.
II. INTERSTATE COMPACT (VOLUNTARY AGREEMENT)		
	Water allocation compact that limits upper basin to low or medium development, with compensating advantages to upper basin.	Need for supplemental compact on suit to allocate water among upper states.
• All Missouri Basin states agree to solve conflicts by compact; Congress grants consent to negotiate.	Water allocation compact that allows high upstream development with compensating advantages to lower basin.	Upper basin states develop fully without allocation between them.
	Delaware type water management compact, U.S. joins as party, compact creates commission.	Upper basin projects proceed as per commission approved plans.
	Negotiations fail.	Resort to: o Interstate lawsuit o Congress
• Upper basin held to low depletions, by any process.	Water allocation compact that divides available water.	State agencies restrict permits to state's quota.
	Negotiations fail.	States resort to lawsuit or Congress.
III. CONGRESSIONAL ALLOCATION (LEGISLATION)		
• Action on Upper basin projects for high and medium depletions.	Projects authorized and funded.	Allocation to upper basin; projects proceed.
	Authorization or funding withheld.	Allocation to lower basin; development held at low level.
• New "Missouri Basin Act" to solve modern basin problems; modernizing and replacing Pick-Sloan Plan.	State participation in formulation, solution fair to all states, agreeable to most, possibly Congressional enactment of failed compact.	As provided, O'Mahoney-Milliken Amendment becomes obsolete, modified or replaced by new Act or action under it.
• Repeal or modification of O'Mahoney-Milliken Amendment in project bill or otherwise.	Senate passage highly unlikely.	As provided.

supplementary water supply will be furnished to 446,304 acres of land now having an inadequate water supply, thus benefiting a total of 5,206,704 acres. Proposed irrigation development is scattered throughout the dryer portions of the basin as follows:

Summary of Irrigation Development (Acres)

State	New Land	Supplemental Supplies	Benefited
Montana	967,130	245,800	1,212,930
Wyoming	281,560	167,400	448,960
Colorado.	101,280	1,719	102,999
North Dakota. . .	1,266,440	--	1,266,440
South Dakota. . .	961,210	11,300	972,510
Nebraska.	989,445	19,930	1,009,375
Kansas.	193,335	155	193,490
Total	4,760,400	446,304	5,206,704

This Act has also been interpreted by Congress to be an allocation. In reporting on the Garrison Project legislation in 1965, the Senate Interior and Insular Affairs Committee reported:

> At the same time, however, the fundamental commitment of the Flood Control Act of 1944 should be recognized. It amounted to a compact, ratified by Congress, assuring the upper basin states that their sacrifice of productive lands to provide benefits for the lower basin would be compensated for by full development of other potentialities in the upper basin states.

The above position was advocated by the state of North Dakota at the August 1982 meeting of the Missouri Basin States Association. Any other definition or interpretation of the Amendment or Act will be extremely detrimental to the upper Missouri River Basin states.

Congressional apportionment in the Missouri River Basin could come about not only as a response to direct conflict over uses of Missouri River water, but also because of project authorization under the 1944 Flood Control Act or a redefinition of the O'Mahoney-Milliken Amendment. Congress could also direct the states to enter into compact negotiations as was recently proposed by Representative Young of Missouri.

Interstate Compacts

If there is a need for a specific quantification of the water allocation in the Missouri River Basin, an interstate compact is felt to be the most desirable means because a compact is the result of negotiations rather than adversary proceedings and should be much less costly and more responsive to state needs.

An interstate compact could be negotiated among all the basin states to define the water uses for the entire basin, or a compact could deal only with that portion of the basin above Sioux City, Iowa. The amount of water to be depleted in the upper basin could be determined from an upper basin/lower basin compact, from Congressional

apportionment, or from an equitable apportionment by the United States Supreme Court. A compact would be possible among all the basin states even if there was a division between the upper and lower basin states. The lower basin would attempt to protect hydropower, navigational, and other instream benefits. The upper basin states would attempt to develop water for future depletion in accordance with the 1944 Flood Control Act. If an upper basin/lower basin allocation was formulated and a compact completed, the amount of water to be depleted in the upper basin could then be apportioned by a compact among the affected states of Nebraska, South Dakota, North Dakota, Montana, and Wyoming. The states of Wyoming, Montana, and possibly North Dakota would contend, however, that there is no need to divide the waters of the tributaries of the Yellowstone River Basin since the Yellowstone River Compact already apportions the unappropriated water among these states. This would also be true for other states involved in interstate compacts on several other tributaries to the Missouri River. Therefore, any interstate water allocation discussion must take the allocations covered by these compacts into account.

Equitable Apportionment

In Chapter V of the full report, the discussion reveals that the United States Supreme Court has never allocated water in a "friendly" law suit. In every case, the court has allocated the water only after other means of apportionment have failed and there exists real harm or threat of harm resulting from increased water uses. Three possible types of lawsuits are described below.

(1) Lower Basin States vs. Upper Basin States. The threat of loss of navigation or increased environmental impacts (and possible loss of hydroelectric power production) could form the basis of a lawsuit brought by the lower basin states against the upper basin states to stop further upper basin development for consumptive purposes. The types of upper basin actions the lower basin states might consider as threats could include: water sales by the upper basin states and by the Bureau of Reclamation; funding of units of the Pick-Sloan Program; water rights issued by states for major projects; actual construction of water development projects; or the authorization of a large interbasin diversion project such as the High Plains Diversion or the Exxon proposal.

Even though it is doubtful that current harm can be shown, the two August 1982 lawsuits, filed in an attempt to halt the ETSI sale and diversion of 50,000 AF/year of water from Oahe Reservoir are examples of lower basin actions in response to a perceived threat. It appears that the lower basin states may attempt to use these court cases to limit future water development in the upper basin regardless of whether harm may or may not be shown.

(2) Upper Basin vs. Lower Basin. Possibilities of threat to the upper basin states which could prompt a lawsuit by these states could include the authorization of a large interbasin diversion project that does not include the authorization of upper basin projects or funding for projects in progress. A second potential threat to the upper basin would be if the federal government funded lower basin projects but refused to fund upper basin projects. The objectives of such a lawsuit could be to define the upper basin/lower basin water allocation or to obtain equitable benefits.

(3) Upper Basin vs. Upper Basin. The objectives of this type of lawsuit would be to define the allocations of water between Montana, Wyoming, South Dakota, North Dakota and other upper basin states. This would happen if an upper basin/lower basin allocation had been settled, but an agreement could not be reached on suballocations of water among the upper basin states. Figure 3 shows this as one of the possible results of any of the three general allocation methods.

TIMING OF ACTIONS TO RESOLVE CONFLICTS

An upper basin/lower basin water conflict of sorts is already in progress in the Missouri River Basin. Although the current levels of river flow are well above the requirements for downstream navigation and instream uses, the lower basin states perceive interbasin diversions, water development for energy, and water development under the Pick-Sloan Missouri Basin Program for irrigation as threats to both their instream uses and future development. Currently, the downstream perceptions are not well founded technically even though present regulation of the six main stem reservoirs "uses" most of the river flows for instream purposes. A large quantity of new water development can take place before there is any risk of curtailing navigation in the lower basin. However, the lower basin states view the recent sale to ETSI of water from Oahe Reservoir in South Dakota as the "tip of the iceberg". Since the 50,000 acre-feet per year is only about two-tenths of one percent of the average annual flow at Sioux City, Iowa (21,725,000 acre-feet) or equivalent to one-eighth to one-tenth of the total water that evaporates from Oahe Reservoir each year, it appears doubtful that the threat of harm can be substantiated. Nevertheless, because of the recently filed lawsuits and other lower basin actions, there is an immediate need for Montana to begin considering its water requirements and preparing for the contingency that some form of water apportionment process may be initiated in the not-too-distant future.

The O'Mahoney-Milliken Amendment appears to provide Montana the necessary protection of future water uses on an upper basin versus lower basin

basis. But the amendment may be challenged if future upper basin depletion could severely impact the lower basin states economically. The problem of upper basin depletion conflicting with lower basin instream flows should not occur before the year 2000, and, in fact, the real threat to navigation may not exist until after the year 2020.

The timing of a perceived threat will depend upon the rate of increased depletions and upon such major actions as appropriation of water, and authorization or funding of a major project. Thus, the Missouri River Basin interstate water conflict has both short-term and long-term aspects. The major differences between the short-term and long-term are the extent to which water depletions increase in the basin and the perceived threat versus the real threat. Both short-term and long-term aspects can involve all three of the allocation methods --congressional apportionment, interstate compact, or equitable apportionment.

Short-term Potential Actions to Resolve Conflict (1982-2000)

The short-term and ongoing conflict involves many political aspects and may be viewed as that period when any harm to instream flows is seen as a threat but cannot be substantiated. Lower basin states may try to "keep the water flowing" by opposing Congressional funding of upper basin water development projects, or by imposing federal or state requirements for water depletion permits or approvals.

Attempting to impede upper basin development could lead to compact negotiations. The pressure to enter negotiations might stem from the states themselves out of the need to eliminate uncertainty and to resolve the political aspects of the conflict. The mandate for negotiations could also come from congressional action that would require the states to define their water allocations before the authorization of federal water projects.

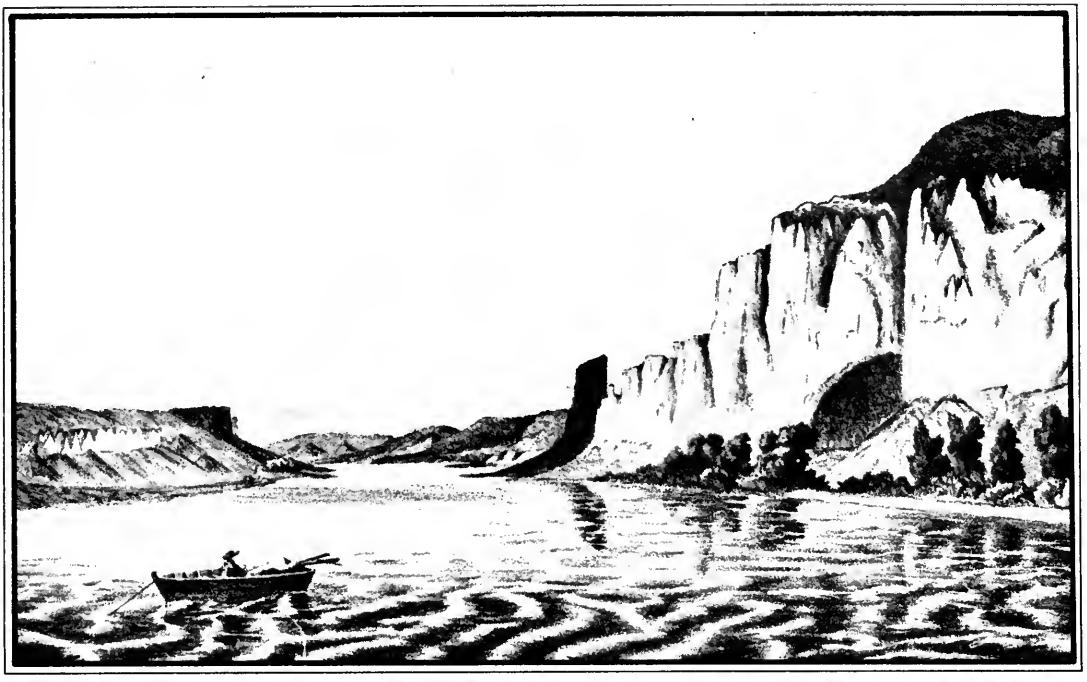
Compact negotiations could also be accelerated to avoid the uncertainties associated with litigation that may affect a state's ability to manage its water. Such might be the case in South Dakota with the ETSI suit filed by the states of Missouri, Iowa, and Nebraska. As it is now, the lawsuit focuses on the processes by which the Department of the Interior approved the ETSI water contract and the Corps of Engineers issued the permit for construction of the diversion facilities. As well, the suit focuses on the depleting effect of the ETSI contract and the nonpreferred use of water for the slurry transport of coal. It does not appear the U.S. Supreme Court will look favorably on this type of lawsuit since the threat of actual harm may be difficult to demonstrate. A court, however, could declare that important procedures were disregarded and require the Bureau and the Corps to make the process adequate. During 1977 the Bureau completed an EIS entitled, "Water for Energy-Missouri River Reservoirs," in which one million acre-feet per year was identified as being available for development by industrial users under limited period contract from Oahe, Garrison, and Fort Peck reservoirs. At that time no noticeable objections were heard from the lower basin states regarding the marketing of this water.

Long-term Potential Actions to Resolve Conflict (after the year 2000)

Assuming the present "conflict" passes unresolved with little action and that water development continues in the future, the long-term conflict would arise when the lower basin states feel that harm to instream flow is imminent. This will probably occur after the year 2000. Based on this study's hydrologic analyses, that point would appear to be at or near the time when upper basin depletions exceed the 1975 level of development by 1.6 to 1.7 million acre-feet per year. This threshold level of development would only affect navigation during a prolonged drought.

Congressional allocation could occur at this time through redefinition of the O'Mahoney-Milliken Amendment or by one of several types of legislation: (1) authorization of single large project or projects; (2) revision of the Pick-Sloan Program authorization in an omnibus bill that includes the authorization of a very large project such as the High Plains diversion; or (3) a congressional directive to the states to negotiate a compact before considering project authorizations. The second and third actions would both require negotiations among the basin states. These negotiations may become an urgent matter in the future, and the states may take on rapid negotiations of a compact to achieve division of water and/or benefits so as to enhance the consideration of legislation by Congress.

An interstate lawsuit could have standing in the U.S. Supreme Court when the level of depletion reaches the "imminent harm" level or if the authorization of a single project or projects would clearly exceed the depletion threshold of 1.6 to 1.7 million acre-feet per year. This would be a major lawsuit and would require considerable effort by Montana to prove its existing water use claims and its need for additional water to meet future consumptive use requirements. The lawsuit would likely last several years and require a great expenditure of funds to cover legal, engineering, and other expenses.



RECOMMENDED STRATEGY FOR MONTANA

Strategy Overview

This study has documented the fact that the current situation in the Missouri River Basin is favorable to Montana. Considerable water is physically available on the main stem to meet the state's current needs and there are ample supplies to meet future requirements even at the high level of development. Additionally, because the O'Mahoney-Milliken Amendment provides a preference to upper basin development of consumptive use over lower basin navigation, Montana can enjoy the legal protection needed to develop its water at the high level.

However, within the lower basin there is concern over the potential lack of flows for navigation in the future. This uncertainty will continue to precipitate lower basin actions which are aimed at frustrating upper basin water development or instituting an interstate water allocation. Since the O'Mahoney-Milliken Amendment is the prime factor in protecting upper basin development, it is likely that it will be challenged.

While Montana may wish to maintain the status quo, the state will eventually be drawn into a challenge on the river. Therefore, Montana's posture should be one of defending the status quo against those who wish to change it. The strategy involves building up defenses, readying an offense, and providing sentinels to give advance warnings. The overview of this strategy is as follows:

(1) Montana should not precipitate any new Missouri River Basin allocation process but should rely upon the 1944 Flood Control Act for protection.

(2) Montana should monitor activities of the other basin states and Congress which would threaten the 1944 Flood Control Act and specifically the O'Mahoney-Milliken Amendment and be prepared to respond to those threats. Such threatening actions would probably be in the form of congressional legislation or a lawsuit.

(3) Montana should monitor water development in other states and congressional activity which might threaten Montana's future use of water and be prepared to respond to those actions.

(4) Montana should encourage a negotiated resolution of the Missouri Basin conflict and discourage any confrontational approaches.

(5) Montana should prepare for the eventuality of a new allocation among all the Missouri basin states and establish the strongest position possible to achieve an allocation which protects Montana's current uses and provides for future water needs.

(6) Montana should take steps to encourage the wise use and development of its water resources.

Strategy Discussion

The following discussion presents the actions needed to implement the strategy outlined above. The programs involve participation by the Montana legislature, the Montana congressional delegation, the Attorney General's office, and state agencies (primarily DNRC, but also the departments of Fish, Wildlife, and Parks, Health and Environmental Sciences, and State Lands).

Strategy Component 1 Rely Upon the 1944 Flood Control Act. The only action necessary at present to implement this component of the strategy is to have the Attorney General and state water managers carefully review the legal opinion by Frank Trelease, Esq. found in Chapter V of the full report. While additional research may be necessary, the state should rely upon the 1944 Flood Control Act and the O'Mahoney-Milliken Amendment as its first line of protection. Montana, like the other upper basin states, should insist that the 1944 Flood Control Act is an allocation.

Strategy Component 2 Monitor Activities Which Threaten the 1944 Flood Control Act and the O'Mahoney-Milliken Amendment. Montana should be alert for congressional actions that limit Montana's options, threaten to adversely define the O'Mahoney-Milliken Amendment, or alter the Act in any way. The Montana congressional delegation and its staff should continually brief the Governor and state water planning authorities on trends, congressional dialogue, and proposed legislation which might lead to a reinterpretation or redefinition of the Act and/or Amendment. Additionally, the state has a responsibility to keep the Montana delegation briefed on the potential for conflict, Montana's water policies and programs, and solutions to the interstate conflict.

Montana should inform its congressional delegation and national decision-makers on the economic and other benefits of upper basin water development versus the much lower benefits of navigation in the lower Missouri River Basin. Any attempts by the lower basin states to enhance the nature of navigation on the Missouri River should be opposed by the upper basin states.

On the other front, Montana should be prepared to participate in any lawsuit initiated by the downstream states that challenges our interpretation of

the O'Mahoney-Milliken Amendment. The proposed working strategy would include establishing a contingency fund for the Attorney General to use in the event of such an interstate lawsuit. It is estimated that a $200,000 contingency fund should enable the Attorney General to begin participating in a lower basin versus upper basin lawsuit involving interpretation of the O'Mahoney-Milliken Amendment. The suggested funding level should provide for the filing of motions, for the preparation of briefs submitted either as intervenor or as a friend of the court, for setting forth the requirements for participation in a major lawsuit, and for developing tactics to put Montana in the best position to prove and protect its water claims. If Montana determines that the two recent lawsuits (filed by the lower basin states et al. against the Bureau of Reclamation and Corps of Engineers regarding the sale of the 50,000 acre-feet per year of water from Oahe Reservoir) could affect the 1944 Flood Control Act, the state may wish to intervene directly or as a friend of the court.

Strategy Component 3 Monitor Other Activities Which Threaten Montana's Water Development. Other activities may occur which threaten Montana's ability to develop its water. Lower basin states combined with other constituencies opposed to water development might frustrate federal funding of upper basin water projects. While Montana might be able to develop its low level potential without federal funding, higher levels probably could not be reached without federal participation. Another approach of the lower basin states might be to seek a limitation on interbasin diversions. While specific actions to meet these contingencies cannot be proposed at this time, Montana can develop a means to quickly identify these threats early on and to respond appropriately.

It can reasonably be anticipated that the states of the Missouri River Basin will continue to seek congressional authorization and funding of water projects identified by the Pick-Sloan Missouri Basin Plan enacted under the 1944 Flood Control Act. Montana must diligently monitor and review all federal agency budget requests and congressional water project legislation related to the Missouri River Basin to ensure that they do not authorize and fund downstream projects that would impinge on Montana's future use of Missouri River waters.

The High Plains Project should be closely monitored by DNRC and the Montana congressional delegation since this project may limit future development of water in Montana as well as in the other Missouri River Basin States. Montana should encourage water conservation in the High Plains states as an alternative to transporting Missouri River water into this region. At some point, Montana must determine if it should act as an intervenor on the High Plains or any other diversion project.

Strategy Component 4 Encourage Conflict Resolution. This study has indicated that Montana and the upper basin states are in a strong position to protect their future water use options in the event of an interstate allocation conflict in the Missouri River Basin. Montana has several significant factors in its favor: (1) the O'Mahoney-Millikin Amendment of the 1944 Flood Control Act protects upstream development west of the 98th Meridian for consumptive uses over navigation; (2) Missouri River water could be used to obtain considerably higher economic benefits from consumptive use development in the upper basin than can be achieved with navigation in the lower basin; (3) about 50 percent of the Missouri River flow at Sioux City, Iowa, originates in Montana; and (4) in order to protect their federal reserved rights against the navigation servitude, the several Indian tribes within the Missouri River Basin would probably support consumptive water development over the maintenance of flows to maintain navigation.

Another significant issue is that the upper basin states have not developed the water projects guaranteed to them under the Pick-Sloan Plan of the 1944 Flood Control Act. The upper basin position has been eloquently repeated by Governor Janklow of South Dakota in his defense of the sale of 50,000 acre-feet per year from Oahe Reservoir in the Missouri. He has stated that South Dakota lost 559,000 acres of prime farm land by the construction in South Dakota of Oahe, Fort Randall, and Big Bend reservoirs, three of the main stem reservoirs authorized under the Pick-Sloan Plan. To date, very little of the water allocated to the upper basin states has been developed.

While this study has indicated Montana's strengths, it appears that the conflict between the upper and lower basins will not be resolved by rational arguments alone. All basin states have interests in the Missouri River and its tributaries. The differences among the basin states should be resolved among themselves without litigation or congressional action, but through discussions and negotiations. Unfortunately, litigation and congressional action have already been initiated by lower basin states based on their perception that upper basin states have or may restrict lower basin water uses. The Missouri Basin states should discuss their issues and concerns through the forum of the Missouri Basin States Association. They should share the same negotiation table just as they share the same river. Perhaps agreement cannot be reached through honest and forthright discussions but, at least at that point, litigation or congressional action would be based on meaningful differences rather than emotional contrivance.

Strategy Component 5 Prepare for the Eventuality of a New Allocation. Montana must ready her offensive and defensive positions for an eventual allocation of the water resources between the upper and lower basin and also among states in the upper basin. In essence, Montana must get its own house in order by solidifying its water rights claims to existing and future uses and by resolving the uncertainties with Indian and federal reserved water rights and the Yellowstone Compact. Among the important actions that must be pursued in order to prepare for an eventual allocation are the following:

a. Document Existing Water Rights and Uses. The ongoing statewide adjudication process is vital to quantifying Montana's claims for existing water use and to protecting the water rights and uses in the event of an interstate water allocation. Knowing the uses and water rights is also necessary to administer Montana's water allotment among water users within the state. The goal should be to achieve realistic preliminary decrees in the Missouri and the Yellowstone River basins as soon as possible, preferably within the next five years. To accomplish this goal, priority must be given to these two basins by accelerating the work of the water courts and DNRC, if possible within the framework of the existing program.

b. Quantification of Indian and federal reserved water rights in Montana. The 1979 Montana Legislature created the Reserved Water Rights Compact Commission as a part of the general adjudication program. The legislators recognized that the final adjudication would be incomplete without a quantification of Indian and federal reserved water rights. They also believed that the process of negotiation might be attractive to the Montana tribes as an alternative to litigation. The Compact Commission was therefore charged with the responsibility of concluding compacts for the equitable division and apportionment of water between

the state and its people and the several Indian tribes and federal agencies claiming reserved water rights within the state. At the present time, the Commission is negotiating with tribes on five of the seven reservations and the U.S. Departments of the Interior, Agriculture, and Defense.

This study supports the mandate of the Compact Commission in quantifying Indian and federal reserved water rights and encourages the conclusion of compacts by the July 1, 1985 deadline. Negotiation of compacts with the tribes and federal agencies will complete the adjudication program and will save Montana, the federal government, and the tribes millions of dollars in litigation costs. It will also provide essential information on irrigable lands and on water available for future appropriation and development. Until a firm water supply can be guaranteed by resolving the reserved water rights, many types of water projects with large financial costs will not be built whether they are on a reservation, on federal land, or in private ownership. Montana will also be in a stronger position in compact negotiations among the Missouri River Basin states if its adjudication program is complete and the reserved right question is settled by negotiating compacts that are acceptable to all parties, including the Montana Legislature and United States Congress.

c. Resolve Yellowstone River Compact issues. The Yellowstone Compact provides recognition of water rights prior to 1950, and an arithmetic formula for calculating the amount of water unappropriated after 1950 that is to be divided between Wyoming and Montana. This compact also provides a basis for apportioning the water at the state line between Montana and North Dakota.

Since the time the Compact was executed in 1950, there has been sufficient water in the four major tributaries (Clarks Fork, Tongue, Powder, and Big Horn) to adequately satisfy pre-1950 water rights and post-1950 development without resorting to the provisions of the Compact for administering the distribution and use of the water supply. Consequently, an administrative procedure has never been developed for this purpose and at the present time, the Compact Commission has not determined the specific quantity of water to which each state is entitled.

The circumstances at present are appreciably different from those that prevailed when the Compact was negotiated. In 1950, concerns were primarily agricultural in nature. Today, agriculture, energy developers, Indian tribes, municipalities, the federal government, and states outside the basin are competing for water in the Yellowstone River Basin. It is now important that Montana join with Wyoming to develop an accounting system with forecasting capability which will allow the Compact Commission to administer the Compact on an equitable and regular basis. Included in the accomplishment of this task is determining the quantity of water available to Montana and Wyoming under the terms of the Compact. Major water developments may not occur on the tributaries unless these uncertainties are resolved.

Other interstate issues in the Yellowstone River Basin which should be resolved to allow for future water development include: (1) the Indian reserved water rights of the Crow and Northern Cheyenne tribes and their effects on the Compact allocation; (2) the unresolved apportionment on the Little Bighorn River between Montana, Wyoming, and the Crow tribe; (3) the possibility that

Wyoming's allocated share may be diverted from the Yellowstone main stem in Montana and transported back into Wyoming; and (4) the ongoing litigation regarding Article X of the Compact. Article X requires the unanimous approval of Montana, Wyoming, and North Dakota before Yellowstone River water can be diverted and transported outside the basin.

d. Develop a centralized water resource data management system. The state needs to develop such a system to manage the state's water resources more efficiently, specifically identifying water resources, existing uses, and the potential for future development. Until the statewide adjudication program is completed, the identification of existing uses and future development potential is Montana's only line of defense to obtain a fair share in any interstate allocation.

Many state and federal agencies are responsible for certain aspects of water resource management in Montana. In order to make their specific decisions, each agency collects the necessary data which are stored in separate agency files and, in many cases, are difficult to relocate. At the present time much of the water resource data is fragmented, neither indexed nor inventoried, not recorded in a standard format, and most importantly, not readily accessible to those who need the information for making management decisions.

The state needs to develop a water resource data management system that has five primary objectives: (1) to inventory and index the location of all pertinent water resource data; (2) to assess the accuracy and completeness of existing data (remove all duplication); (3) to standardize data collection procedures; (4) to develop and implement a centralized data system that is easily accessible in a useable format to all users; and (5) to establish a continuous and integrated water resource data collection and management program.

Through the National Water Use Data System (NWUDS) of the U.S. Geological Survey (USGS), DNRC, in conjunction with other water resource management agencies and the university system began designing a centralized water use data management system for Montana in 1980. However, funding for the NWUDS program has recently been cut by the federal government and the program is destined for extinction. The development of a centralized water resource data management system should be encouraged because the best water resource management decisions can only be made with the most accurate and updated information available. Particularly relevant is the collection of accurate information on water use and the potential for future development to justify Montana's allocation under compact negotiations among the Missouri River Basin states.

e. Plan and establish future claims to water. In Chapter VI of the full report the legal criteria for establishing claims for future water use are discussed. The methodologies range from an inventory of potential projects (the least effective method) to conditional permits or "inchoate rights" (the most effective). Since it

will take some time to develop vested water rights ("inchoate rights") for claims to future use, Montana must demonstrate that it has both the potential for substantial additional development and the intent to diligently pursue that development. While the 1944 Flood Control Act provides Montana with abundant water supplies that are protected from downstream navigation claims, non-use of this water and lack of diligence in putting water to use would add weight to the argument that the act should be changed. Consequently, it is recommended that a process, not unlike the Yellowstone Reservation process, be undertaken for the Missouri River Basin in Montana. The steps required for such a process in the Missouri River Basin should include: (1) identification of water resources, (2) identification of potential uses, (3) input from other agencies and interested water users, (4) preparation of environmental impact analyses, (5) public hearings, and (6) consideration and order by the Board of Natural Resources and Conservation or adoption by the Montana Legislature. Special legislation would be required to implement this process.

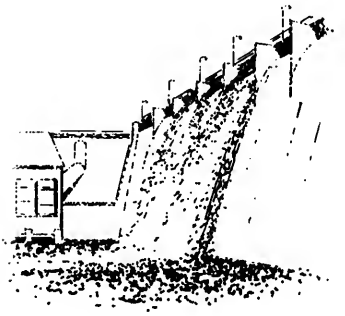
The first step in the process to establish claims for future water use is an inventory of water development potentials in the Missouri River Basin. This step has, to a large degree, been completed through the Upper Missouri Level B Study. The projects identified in that report, along with the USDA Upper Missouri Irrigation Study and others, need to be compiled and standardized into a single inventory.

Building on this base, the Water Development Program should provide a comprehensive determination of Montana's water development potential and need in the basin. Public review of this analysis would be sought to help ensure that all reasonable and legitimate projects would be included. The Board of Natural Resources and Conservation and the Montana Legislature, after a hearings process, would then designate quantities of water in the basin necessary for Montana's use. Any such legislative designation should, in turn, be strengthened by the financial incentives of the Water Development Program in order to assure that it is transformed into project construction. If a more formalized system of adopting these quantities of water is felt necessary, the process could be patterned after the Montana water reservation system. However, other options that would protect Montana's future use of water should also be considered.

This process, from water needs identification to actual water use, would be a distinct state program that clearly demonstrates Montana's confidence in the 1944 Flood Control Act and its commitment to develop Missouri Basin waters. Since the emphasis of the program is on establishing claims which can reasonably be put to use, Montana will have strengthened its rights to future water use and will be in an enviable position to defend its water needs in an interstate water allocation.

f. Identify and resolve policies and issues. An advisory council such as the Water Policy Advisory Council should be created. This council should consist of state water leaders, legislators, water users, professional resource managers, and agency representatives who would review water issues and state policies periodically or as the need arises. The state may wish to use the existing, nine-member Water Development Advisory Committee which is responsible for advising DNRC on the water development applications

which should be funded. The committee or council would develop recommendations about state water development in light of the interstate allocation requirements and the urgency indicated by potential conflicts.



Strategy Component 6 Develop Water Uses in Montana. One of the strategy elements is to encourage the development of Montana's water resources in a wise and efficient manner. However, encouragement is not enough. The state must accept the responsibility to put its water to beneficial use. Interstate lawsuits are generally considered the least desirable form of allocation; however, in those cases involving equitable apportionment, the courts have almost always been reluctant to deny established uses. Consequently, the best action to protect Montana's future options to Missouri River water is to identify feasible projects and then put the water to beneficial use.

The state needs to encourage and assist, both financially and technically, the development of needed projects. In doing so the state can promote projects and activities which meet goals identified by the state as important to its future prosperity and which otherwise may not be addressed. Such goals presently include: efficient use of natural resources including water, energy, land, and air; provision of water for the improvement of family farm operations; provision of such public benefits as recreation, flood control, erosion reduction, water quality enhancement, sediment reduction, and wildlife conservation; construction of multipurpose facilities; and water storage needed to capture early season flows. In providing these benefits, the state will play an active role in maintaining its renewable resources for the long-term benefit of its citizens. Some of the means to develop new uses include:

a. Promote Federal Water Projects. The State Water Conservation Board actively promoted many of the large federal projects which exist in Montana today. Canyon Ferry Dam, Yellowtail Dam, Hungry Horse Dam, Fort Peck Dam, Tiber Dam, and the Helena Valley and Huntley Projects all received active state support from the early planning stages to actual construction. Many of these projects were authorized under the Pick-Sloan Plan of the 1944 Flood Control Act. However, Montana has not developed water to its fullest extent in these storage projects nor has the state developed new projects under this plan since the mid-1950's. In contrast, South Dakota and North Dakota have been and are still actively seeking Pick-Sloan authorization and federal funding for water projects in their respective states. Montana should make a concerted effort to identify those projects that qualify under the Pick-Sloan Plan and then prioritize them. The state, with the unified assistance of the Montana congressional delegation and the Bureau of Reclamation and other federal agencies, should then seek federal authorization and funding. The state should cooperate with the federal agencies in the feasibility and design studies. The federal government, primarily the Bureau of Reclamation, should have the major responsibility for construction, operation, and maintenance of the facilities.

b. Perfect Water Reservations. It is critically important that the water reserved under the Yellowstone reservation process be developed within a reasonable time frame and that the reservants adhere to the schedule stipulated by the Board of Natural Resources and Conservation in the Reservation Order. This process must be able to withstand an equitable apportionment lawsuit among the Missouri Basin states. The Montana legislature realized this and allocated funds for administrative and technical assistance to the Yellowstone conservation districts in developing their reservations. The state should continue to closely monitor the development of these reservations to assure compliance with the Board reservation order. If the need arises, the state legislature may need to provide funding for additional technical and financial assistance to fully develop the conservation district reservations.

c. Develop state water projects. Since the early 1930's the State of Montana has been actively involved at some level with the promotion and construction of water development projects. In a special legislative session convened in 1934, the state legislature established the State Water Conservation Board and charged it with the responsibility to coordinate the construction of water projects necessary to supply water to Montana's agricultural lands. This board, with the aid of federal funds, developed 181 water projects around the state at a cost of over $22 million. These projects, many of which are still being used today, established over 815 miles of canals and irrigated 400,000 acres of cropland.

Since the initial push for development in the 1930's and 1940's, Montana's financial involvement in water projects has been minor because the federal programs have provided considerable amounts of funding for both small and large projects within the state. Now the trend of reduced federal funding is placing a greater proportion of the financial burden upon the state. Therefore, the state should again consider accepting the responsibility of building new water projects. However, the state should concentrate on only those projects that will provide the greatest economic and environmental advantages to Montana.

d. Assist Indian Water Development. The state should encourage the development of joint state-Indian water projects as a means to resolve Indian reserved water right conflicts. For example, a compact between the Northern Cheyenne tribe and the Reserved Water Rights Compact Commission representing the State of Montana will more than likely hinge upon the construction of an enlarged Tongue River Reservoir, which could provide enough water to satisfy both the tribe and the State of Montana. Specifically the tribe needs water to satisfy the reserved water rights on the Reservation. The state desires a safe dam in place of the existing hazardous structure, enough water to supply the Tongue River irrigators and, like the tribe, enough water to resolve the state-Indian water rights conflict. Both the state and tribes realize that resolution of the water right issues will firm up the water supply available for future development both on and off the reservation and can only expedite and enhance a state water development program. The state is encouraged to consider the need for joint Indian-State water projects as a catalyst for the quantification and resolution of Indian reserved water rights on the seven reservations in Montana.

e. Assist Private Water Development. An important component of a comprehensive water development program is to encourage and assist private sector projects and activities. The types of undertakings involved are diverse and range from planning/feasibility studies to construction and rehabilitation of rural water development systems to streambank stabilization, erosion control, canal lining, and water storage. Although needed throughout the state, development of these types of projects is not proceeding because of high costs and limited payback potential. Projects such as these need to be carefully evaluated on a case-by-case basis to determine whether technical or financial assistance is appropriate. Funding needed to promote appropriate water development by the private sector could come from a number of sources; the most likely would be the Montana Water Development Program.

If Montana is to realize a pervasive water development program, such as that outlined above, important consideration must be given to the means of financing such an effort, since federal funding for water projects has been greatly reduced. For example, the Land and Water Conservation Fund which used to make three million dollars available each year in Montana for water projects has been cut to zero; the Soil Conservation Service PL 556 program used to provide ten million dollars a year, but no new projects have been approved in the past two years; the U.S. Bureau of Reclamation's small projects loan program which provided low interest loans for irrigation projects has seen all its approved projects shelved for the past two years; the Farmer's Home Administration has $312.4 million available this year, one-half of its normal allottments; and the Old West Regional Commission which provided planning funds for water projects is now defunct.

The 1981 Montana Legislature created a water development fund which contains a $250 million bonding authority. However, because of the projected federal cut backs in water development, this program may not provide enough funding to develop Montana's water resources and to put the state into a desirable position before compact negotiations begin in the Missouri River Basin. The state needs to evaluate other sources of revenue; four possibilities are discussed below.

a. Water marketing. The state should evaluate instate and out-of-state marketing of limited amounts of water from existing state and federal reservoirs and from proposed reservoirs with water reservations (Bureau of Reclamation and DNRC in the Yellowstone River Basin) as a means to assist in the financing of future water projects. It is recommended that the state determine the economic, tax, administrative, legal, social, and environmental advantages and disadvantages of water marketing before making a final decision. The cost of the study is estimated to be $75,000.

It appears that approximately one million acre-feet per year of stored water may be available to Montana for multiple purposes in the Missouri and Yellowstone River basins. In the Yellowstone River Basin, as much as 500,000 acre-feet per year may be available from Yellowtail Reservoir and possibly 20,000 acre-feet per year in the proposed enlargement of the Tongue River Reservoir. The DNRC is evaluating industrial water marketing as a means of paying for the Tongue River project and thereby continue to supply water to the Tongue River irrigators and to resolve the reserved water rights on the Northern Cheyenne Reservation. Also, through the Yellowstone Reservation process, a firm supply of 200,000 to 300,000 acre-feet per year could

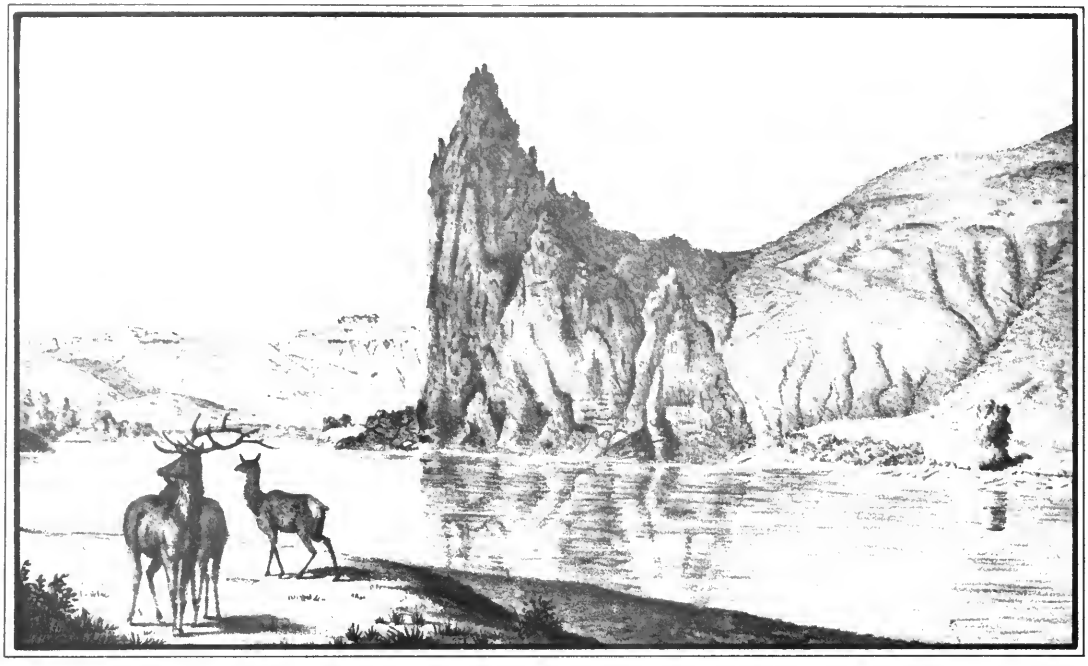
be available for industrial, agricultural, municipal, and recreational uses in off-stream storage projects. In the Missouri River Basin, 300,000 acre-feet per year of stored water in Fort Peck Reservoir has been designated for industrial marketing by the Bureau of Reclamation. The DNRC has a contract with the Bureau which allows the Department first option to market this amount of water. At the present time, DNRC has not been able to market any of the water from Fort Peck Reservoir.

The large industrial demand for water that was experienced in the early 1970's has diminished considerably in Montana. For example, at the time, the Bureau of Reclamation had signed option contracts with industrial users for 623,000 acre-feet per year from Yellowtail Reservoir. All of the option contracts have now been dropped and, according to the Bureau, there is little or no demand for industrial water from Yellowtail Reservoir at this time. An exception, however, appears to be the demand for water for coal slurry pipelines. The state may wish to evaluate marketing a limited amount of stored water from existing state and federal reserves for slurry purposes. Coal slurry may prove attractive because the amount of water required to transport a ton of coal from Montana is 5 to 7 times less than the amount needed to convert the coal in Montana for out-of-state energy needs. If coal can be supplied cheaper to energy customers in other states by slurry pipelines than by railroads, the demand for Montana coal will probably increase. This may cause an increase in coal mining activity in Montana which in turn may have detrimental environmental impacts.

b. Hydropower development on federally-owned facilities. The state should explore the possibility of joint local-state-federal development of hydropower on such federally-owned facilities as Yellowtail Afterbay Dam. In a joint venture, the local and state participants could finance their portion of the cost through the Water Development Program and the Bureau of Reclamation would obtain authorization and funding through Congress. The state would earmark its revenues for other water development projects and activities in the state. The Bureau of Reclamation could conduct the feasibility and design studies, construct the projects and operate the facility after completion.

c. Hydropower development on state-owned projects. The state has a process for developing hydropower on state-owned facilities and for earmarking the revenues for water development, specifically for the rehabilitation of existing state projects. It is recommended that the state continue to pursue hydropower development on its projects as a means to generate revenues for repairing and maintaining deteriorating state-owned projects. This mechanism will assure that Montana can continue to put water from its existing state-owned projects to beneficial use.

d. Increase use of coal severance tax. The state may wish to evaluate the use of more of the coal severance revenues to fund certain types of water development. Because of federal cutbacks in water development, selective development of Montana's water, which is a renewable resource, can only help Montana's economy.



COST OF STRATEGY IMPLEMENTATION

An integral part of the strategy to achieve an interstate water allocation favorable to Montana is to fund the programs necessary to establish and perfect the state's water claims. A five-year budget has been estimated in tabular form with line items indicated for each of the work strategy methods described herein. These costs are in addition to ongoing programs.

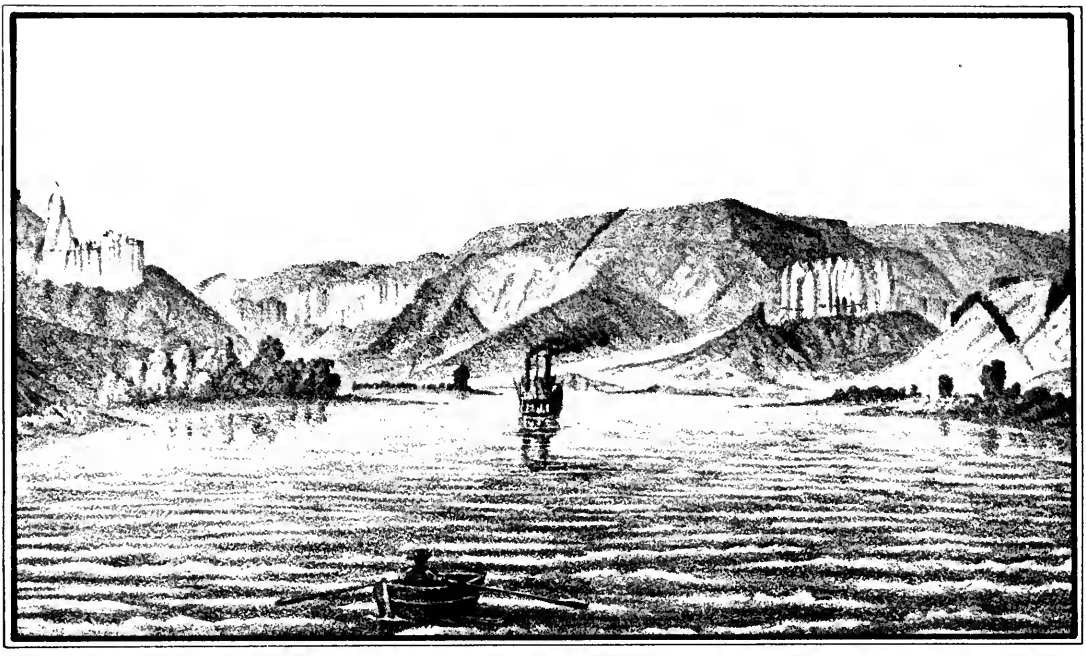
Table 9 gives the estimated funding requirements calculated at the 1982 level of costs. It should be pointed out that such costs of project implementation as feasibility/prefeasibility studies, geotechnical investigations, final engineering designs, project management, construction inspection, and administrative and legal costs are not included. Such costs would be defined and provided for in the legislative project authorizations and the Montana Water Development Program.

About one million dollars of expenditures are identified over a five-year period to help ensure that Montana receives an equitable share of water in the Missouri River Basin. This is a small price to pay for the economic benefits derived from water development in Montana. For example, at just the low level of projected development, an estimate of an additional $31.9 million per year of gross crop values from new irrigated lands can accrue to the state by the year 2000, and energy/coal development can generate $269.9 million per year by the year 2000 (see Table 7). Clearly, the projected costs of establishing Montana's claim to water will be offset by the ultimate economic benefits to the state.

TABLE 9. A FIVE-YEAR AGENCY BUDGET FOR A MONTANA INTERSTATE ALLOCATION OF MISSOURI RIVER WATER

Item	$1000 Per Year[1]					
	1984	1985	1986	1987	1988	5-Year TOTAL
Industrial Water Marketing Study	75					75
Process for Designating Missouri River Water for Future Use	100	100	100	150	150	600
Resolve Yellowstone River Compact Issues	50	50	50	50		200
Water Resources Data Management	50	50	50	50	50	250
Legal Assistance (Contingency)	200					200
TOTALS	475	200	200	250	200	1,325

[1]All expenditures are shown in 1982 dollars.



CONCLUSIONS

The purpose of this study was to identify the potential conflicts in water usage in the Missouri River Basin, quantify those conflicts, estimate the time when such events will occur, and propose a strategy for Montana to use in the resolution of those conflicts. This study has documented that there is a potential conflict between navigation in the lower basin and consumptive use development in the upper basin. Montana is currently in a position of having several significant factors in its favor. Among them is the fact that the O'Mahoney-Milliken Amendment to the Flood Control Act of 1944 assures that water will be available for consumptive uses west of the 98th Meridian. Additionally, a preliminary analysis of future economic benefits which would accrue from future uses of basin water showed that the highest economic return will be realized through upper basin water use. These points underscore the fact that the best position for Montana would be for the state to continue to develop its water. However, Montana also realizes the need to protect her instream flows, which benefit downstream states, such as the 5.5 million acre-feet per year reserved in the Yellowstone River at the Montana North Dakota border. In any event, if the upper basin states continue to develop water, a conflict will eventually develop between the upper and lower basin states since navigational and other instream uses downstream are currently benefiting from the surplus water flows. Social and economic disruption will occur if the depletions in the upper basin increase and flows decrease beyond a threshold level in the lower basin. Therefore, the conflict must be resolved, probably through one of the three forms of legal water allocation. This study has indicated only a limited number of actions that might be taken to resolve the conflict. However, the components of the strategy should provide the broad base upon which to build a defense against the many varied challenges to Montana's claim to water in the Missouri River Basin.

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